Editorial

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Biographical notes: T. Özel received his PhD in Mechanical Engineering from The Ohio State University in 1998. He is an Associate Professor of Industrial and Systems Engineering at Rutgers University and the Director of Manufacturing Automation Research Laboratory. His research interest includes computational modelling of manufacturing processes, automated manufacturing and process control, optimisation of processes and systems, and micro-manufacturing sciences. He has over ten years of experience in teaching and researching in the field. He has been Editor, Guest Editor, Editorial board member and Reviewer for several international journals. He has published over 50 refereed papers in international journals and conferences.

J. Paulo Davim received his PhD in Mechanical Engineering from University of Porto in 1997 and the Aggregation from University of Coimbra in 2005. Between 1986 to 1996, he was a Lecturer in University of Porto. Currently, he is Aggregate Professor in Department of Mechanical Engineering of the University of Aveiro and Head of MACTRIB – Machining and Tribology Research Group. He has more 22 years of teaching and research experience. He is the Editor of three International Journals, Guest Editor, Editorial board member, Reviewer and Scientific Advisory for many international journals and conferences. He has also published more than 200 papers in SCI journals and conferences.

Manufacturers have been continuously facing with challenges to increase productivity, decrease costs, and maintain high product quality at the same time. Machining is still one of the most popular method of producing discrete metal parts. Process development and planning for machining systems involves process modelling and analysis, where parameters selected by costly experimentation with trial-and-error, and often, the resultant solutions are found sub-optimal. Those sub-optimal practices cost billions of dollars by means of wasted material, energy, resources, and labour word wide. The advances in sensor technology, computational methods and evolutionary algorithms,

and multi-objective optimisation methods create ever-more effective solutions to engineering problems. The premise of intelligent machining systems is that with the better utilisation of sensor-assistance, predictive models, and computational methods, these practices might be operated at most optimum conditions, hence substantial loss can be avoided. Models that predict the process behaviour are compulsory for effective engineering decision-making and optimisation, and are essential part of the life-cycle engineering. Intelligent methods and approaches would help effectively control and optimise advanced machining processes and assist in engineering decision-making process. This special issue of the *International Journal of Materials and Product Technology* (*IJMPT*) includes research papers related to intelligent modelling and optimisation approaches for advanced machining processes (e.g., hard turning, high speed milling, burr-free machining, dry grinding and electro discharge machining) for discrete part manufacturing. This issue includes 14 papers which address the issues associated with modelling, predicting and optimising these machining processes. A brief summary of the main contributions is discussed below.

First four papers are dedicated to milling optimisation. Kurdi et al. present a systematic approach in two part paper to milling optimisation for material removal rate and part accuracy when considering process stability in the presence of uncertainty. Fazelinia and Olgac's paper presents a new perspective to the milling optimisation problem by utilising Cluster Treatment of the Characteristic Root (CTCR) procedure to assess process stability in variable pitch milling. Abbas et al. introduce decision analysis approach to milling optimisation problem in the presence of uncertainty with some case studies. Leopold discusses the developments in physical models for burr prediction, verification and reduction towards clean machining and manufacturing of discrete metal parts. Tawakoli et al. discusses artificial neural networks based modelling and monitoring of CBN grinding wheel condition for dry and environmentally benign grinding. The special issue continues with three papers on optimisation of turning processes. Sardiñas et al. present genetic algorithm based and Ojha et al. present soft computing based optimisation for multi-pass turning processes. Nandi and Davim use a fuzzy logic based optimisation approach for hard turning processes. Patra et al. propose a drill wear prediction systems based on wavelet packet transform based normalised radial basis function networks. Ramakrishnan and Karunamoorthy and Kanagarajan et al. present their work on electro discharge machining in two papers. Gaitonde et al. use response surface methodology to analyse burr size in drilling. Finally, Özel et al. present a study on artificial neural network based process modelling for turning of steel parts using conventional and wiper inserts. In this work, comparison of surface roughness attained by conventional and multi-radii wiper inserts have been made.

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